Name: Date:

Polynomial Factoring solution (version 670)

1. **The quadratic formula says if $ax^2 + bx + c = 0$ then $x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$. Use the quadratic formula to solve the following equation.**

$$x^2 - 2x + 21 = 0$$

Simplify your answer(s) as much as possible.

Solution

$$x = \frac{-(-2) \pm \sqrt{(-2)^2 - 4(1)(21)}}{2(1)}$$

$$x = \frac{-(-2) \pm \sqrt{4 - 84}}{2(1)}$$

$$x = \frac{2 \pm \sqrt{-80}}{2}$$

$$x = \frac{2 \pm \sqrt{-16 \cdot 5}}{2}$$

$$x = \frac{2 \pm 4\sqrt{5}\, i}{2}$$

$$x = 1 \pm 2\sqrt{5}\, i$$

Notice that i in NOT under the square-root radical symbol!!

2. **Express the product of $-6 + 4i$ and $-9 - 3i$ in standard form $(a + bi)$.**

Solution

$$(-6 + 4i) \cdot (-9 - 3i)$$

$$54 + 18i - 36i - 12i^2$$

$$54 + 18i - 36i + 12$$

$$54 + 12 + 18i - 36i$$

$$66 - 18i$$

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3. **Write function $f(x) = x^3 + 6x^2 + 11x + 6$ in factored form. I'll give you a hint: one factor is $(x + 2)$.**

Solution

	1	6	11	6
-2		-2	-8	-6
	1	4	3	0

$$f(x) = (x + 2)(x^2 + 4x + 3)$$

$$f(x) = (x + 2)(x + 3)(x + 1)$$

4. **Polynomial p is defined below in factored form.**

$$p(x) = -(x + 3)^2 \cdot (x - 1) \cdot (x - 4)^2 \cdot (x - 8)$$

Sketch a graph of polynomial $y = p(x)$.